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Investigating charge carrier effects in silicon membranes using fs laser.

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Abstract content (Max 300 words)Formatting & Special chars

The second harmonic (SH) generated at the Si/SiO₂ interface varies on a time scale of several seconds when illuminated with high intensity near infrared laser pulse ($\lambda = 800$ nm, with 80 MHz frequency, $E_{\text{pulse}} \leq 10$ nJ). The temporal behaviour arises from generation of trap sites and subsequent trapping of charges at the interface via multi-photon processes. These trapped charges create an interfacial electric field which influences the nonlinear properties of the Si/SiO₂ interface and leads to a time dependent second harmonic (TDSH) signal on continuous irradiation. This is known as electric field induced second harmonic (EFISH) generation. In this work, measurements are focused on the simultaneous measurements of EFISH signal from a free standing oxidized Si membrane both in reflection and transmission as a function of the irradiation time. Results show that the transmission of the fundamental irradiation as well as the transmitted SH signal generated from the Si membrane increases, reaches a maximum, and then decreases again as the input intensity is increased. The nonlinear behaviour of the transmitted signal is explained using free charge carrier absorption (FCA) in silicon.

Apply to be considered for a student award (Yes / No)?

yes

Level for award (Hons, MSc, PhD, N/A)?

PhD

Main supervisor (name and email) and his / her institution

Erich Rohwer, egr@sun.ac.za

Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

yes

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Yes

Primary author: Mr NDEBEKA, Wilfrid (Laser Research Institute, Stellenbosch University)

Co-authors: Dr STEENKAMP, Christine (Laser Research Institute, Stellenbosch University); Prof. ROHWER, Erich (Laser Research Institute, Stellenbosch University); Prof. STAFAST, Herbert (Leibniz Institute of Photonic Technology, Jena, Germany); Dr NEETHLING, Pieter (Laser Research Institute, Stellenbosch University)

Presenter: Mr NDEBEKA, Wilfrid (Laser Research Institute, Stellenbosch University)

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